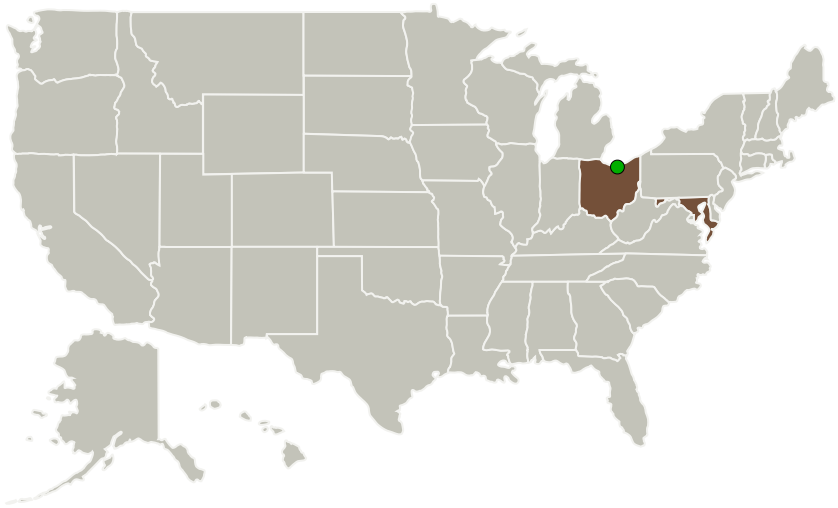
A Novel Hemispherical and Dynamic Camera for EVAs, Phase I

Completed Technology Project (2012 - 2012)

Project Introduction

The primary objective of this SBIR project is to develop a novel Hemispherical and Dynamic Camera(HDC), with unprecedented capability of optically unwrapping, thus can obtain directly the high resolution undistorted (unwrapped) 360□ hemispherical video or still images without requiring any external computing resources for performing digital unwrapping. This novel technology would lead to ultra-compact, low-power, light weight, and high resolution hemispherical camera for EVAs. The unique Neo360 optics offers advantages over any existing technologies. The HDC camera can: (1) Produce unwrapped hemispherical images optically without using any external computational hardware and software, greatly reducing size, weight and power (SWaP) of the HDC. (2) Capture real-time video of seamless hemispherical surrounding scene using no moving components; (3) Unwrap the hemispherical image optically and the outputs images/video is directly viewable for human interpretation; (4) Preserve image quality via optical unwrapping - no digital re-sampling artifacts that deteriorate image; (5) Acquire hemispherical scene with full pixel resolution of imaging sensor (conventional 360□ optics acquires circular images, making 42% active pixels of sensor useless); (6) Eliminate time delay caused by digital processing - Hemispherical video can be transmitted directly; (7) Improve the image transmission efficiency by 70% for EVA video relay.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Xigen, LLC	Lead Organization	Industry	Rockville, Maryland
Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

Primary U.S. Work Locations	
Maryland	Ohio

Project Transitions

February 2012: Project Start

August 2012: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/140312)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Xigen, LLC

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Jason Geng

Co-Investigator:

Jason Geng

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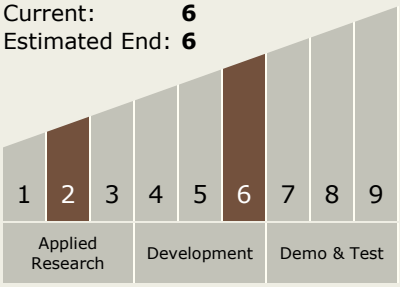
Technology Maturity (TRL)

Start: **2**
Current: **6**
Estimated End: **6**



Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
  - TX06.2 Extravehicular Activity Systems
    - TX06.2.3 Informatics and Decision Support Systems

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System